

10/619,801

Cafe

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Patent No.: 7,343,016 B2
Issued: March 11, 2008
Name of Patentee: The Penn State Research Foundation
Title of Invention: LINEAR INDEPENDENCE METHOD FOR NONINVASIVE
ON-LINE SYSTEM IDENTIFICATION/SECONDARY PATH
MODELING FOR FILTERED-X LMS-BASED ACTIVE
NOISE CONTROL SYSTEMS
Customer No.: 27,623 Attorney Docket No.: 823.0145USU

Mail Stop Certificate of Correction Branch
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Certificate
APR 02 2008
of Correction

TRANSMITTAL LETTER

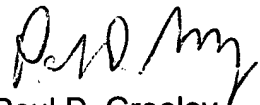
Dear Sir:

We are enclosing:

1. Request for Certificate of Correction of Patent;
2. PTO Form 1050 in duplicate;
3. Transmittal Letter in duplicate; and
4. Postcard.

Please charge any fees or credit any overpayment of fees, if necessary, to Deposit Account No. **01-0467** in the name of Ohlandt, Greeley, Ruggiero & Perle, L.L.P. A duplicate copy of this Transmittal is attached for that purpose.

Respectfully submitted,



Date: March 27, 2008

Paul D. Greeley
Reg. No. 31,019
Ohlandt, Greeley, Ruggiero & Perle, L.L.P.
One Landmark Square, 10th Floor
Stamford, CT 06901-2682
Tel. (203) 327-4500

CERTIFICATE OF MAILING

I HEREBY CERTIFY THAT THIS CORRESPONDENCE IS BEING DEPOSITED WITH THE U.S. POSTAL SERVICE AS FIRST CLASS MAIL IN AN ENVELOPE ADDRESSED TO: MAIL STOP: CERTIFICATE OF CORRECTION BRANCH, COMMISSIONER FOR PATENTS, P.O. BOX 1450, ALEXANDRIA, VA 22313-1450 ON MARCH 27, 2008.

LYNN C. WALLACH
NAME


SIGNATURE

RECEIVED-USPTO
MARCH 27 2008 Publication
DATE

APR 02 2008

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Patent No.: 7,343,016 B2

Issued: March 11, 2008

Name of Patentee: The Penn State Research Foundation

Title of Invention: LINEAR INDEPENDENCE METHOD FOR NONINVASIVE
ON-LINE SYSTEM IDENTIFICATION/SECONDARY PATH
MODELING FOR FILTERED-X LMS-BASED ACTIVE
NOISE CONTROL SYSTEMS

Customer No.: 27,623 Attorney Docket No.: 823.0145USU

Mail Stop Certificate of Correction Branch
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

TRANSMITTAL LETTER

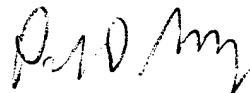
Dear Sir:

We are enclosing:

1. Request for Certificate of Correction of Patent;
2. PTO Form 1050 in duplicate;
3. Transmittal Letter in duplicate; and
4. Postcard.

Please charge any fees or credit any overpayment of fees, if necessary, to Deposit Account No. **01-0467** in the name of Ohlandt, Greeley, Ruggiero & Perle, L.L.P. A duplicate copy of this Transmittal is attached for that purpose.

Respectfully submitted,



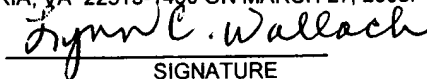
Date: March 27, 2008

Paul D. Greeley
Reg. No. 31,019
Ohlandt, Greeley, Ruggiero & Perle, L.L.P.
One Landmark Square, 10th Floor
Stamford, CT 06901-2682
Tel. (203) 327-4500

CERTIFICATE OF MAILING

I HEREBY CERTIFY THAT THIS CORRESPONDENCE IS BEING DEPOSITED WITH THE U.S. POSTAL SERVICE AS FIRST CLASS MAIL IN AN ENVELOPE ADDRESSED TO: MAIL STOP: CERTIFICATE OF CORRECTION BRANCH, COMMISSIONER FOR PATENTS, P.O. BOX 1450, ALEXANDRIA, VA 22313-1450 ON MARCH 27, 2008.

LYNN C. WALLACH
NAME


SIGNATURE

MARCH 27, 2008
DATE

RECEIVED-USPTO
Patent Publication



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Patent No.: 7,343,016 B2
Issued: March 11, 2008
Name of Patentee: The Penn State Research Foundation
Title of Invention: LINEAR INDEPENDENCE METHOD FOR NONINVASIVE
ON-LINE SYSTEM IDENTIFICATION/SECONDARY PATH
MODELING FOR FILTERED-X LMS-BASED ACTIVE
NOISE CONTROL SYSTEMS
Customer No.: 27,623 Attorney Docket No.: 823.0145USU

Mail Stop Certificate of Correction Branch
Commissioner for Patents
P.O. Box 1450 Alexandria, VA 22313-1450

REQUEST FOR CERTIFICATE OF CORRECTION

Dear Sir:

We hereby request that the above-identified patent be corrected as follows:

IN THE ABSTRACT PAGE

Code (75) Please correct residence of Inventor **Benjamin Jung Kim** to read
"State College, PA (US)"

Code (73) Please correct residence of Assignee **The Penn State Research Foundation**
to read "University Park, PA (US)"

IN THE DESCRIPTION

Column 1,

Line 14, after "...periodic noise." please add the following heading and paragraph from
Line 15 and following:

--FEDERALLY SPONSORED RESEARCH AND DEVELOPMENT

This invention was made with government support under Contract No. N00039-97-D-0042,
Delivery Order No. 227, awarded by the Naval Sea Systems Command. The Government
has certain rights in the invention.--

RECEIVED-USPTO
Patent Publication

APR 2 2008

REMARKS

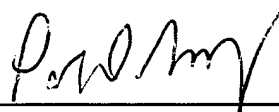
Entry of the indicated CORRECTIONS in the Patent identified above is respectfully requested.

It is submitted that the residence of the Inventor and the residence of the Assignee were entered incorrectly by the PTO. A copy of the cover sheet of the application as published, the recorded Assignment and the inventor's Declaration and Power of Attorney are enclosed to support the correction.

It is submitted that the statement of development support from the Naval Sea Systems Command was omitted without deceptive intent, as an inadvertent error on Applicant's part. The Confirmatory License is recorded on Reel 014617 and Frame 0652.

For the reasons set forth above, it is recommended that the current request for entry of corrections be accepted, and that the proper Certificate of Correction be issued to Patent No. 7,343,016 B2.

Respectfully submitted,



Dated: March 27, 2008

Paul D. Greeley
Registration No. 31,019
Attorney for Applicant
Ohlandt, Greeley, Ruggiero & Perle, LLP
One Landmark Square, 10th Floor
Stamford, CT 06901-2682
Tel: (203) 327-4500
Fax: (203) 327-6401

RECEIVED-USPTO
Patent Publication

APR 02 2008



US007343016B2

(12) **United States Patent**
Kim

(10) **Patent No.:** **US 7,343,016 B2**
(45) **Date of Patent:** **Mar. 11, 2008**

(54) **LINEAR INDEPENDENCE METHOD FOR
NONINVASIVE ON-LINE SYSTEM
IDENTIFICATION/SECONDARY PATH
MODELING FOR FILTERED-X LMS-BASED
ACTIVE NOISE CONTROL SYSTEMS**

4,987,598 A * 1/1991 Eriksson 381/71.11
5,940,519 A 8/1999 Kuo 381/71.11
6,418,227 B1 * 7/2002 Kuo 381/71.11
6,418,228 B1 7/2002 Terai et al. 381/71.11
6,847,721 B2 * 1/2005 Zhang et al. 381/71.11

(75) Inventor: **Benjamin Jung Kim, McClean, VA**
(US)

(73) Assignee: **The Penn State Research Foundation,**
University Park, PA
(US)

(*) Notice: Subject to any disclaimer, the term of this
patent is extended or adjusted under 35
U.S.C. 154(b) by 667 days.

(21) Appl. No.: **10/619,801**

(22) Filed: **Jul. 16, 2003**

(65) **Prior Publication Data**

US 2004/0037430 A1 Feb. 26, 2004

Related U.S. Application Data

(60) Provisional application No. 60/397,526, filed on Jul.
19, 2002.

(51) Int. Cl.
A61F 11/06 (2006.01)

(52) U.S. Cl. **381/71.12; 381/71.1; 381/71.8;**
381/71.11

(58) **Field of Classification Search** 381/71.1,
381/71.11, 71.12, 71.8, 71.6
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

4,677,676 A 6/1987 Eriksson 381/71

OTHER PUBLICATIONS

L.J. Eriksson and M.C. Allie, "Use of Random Noise for On-Line
Transducer Modeling in Adaptive Active Attenuation System,"
Journal of the Acoustical Society of America, vol. 88, 1989, pp.
797-802.

S.D. Sommerfeldt and J. Tichy, "Adaptive Control of a Two-Stage
Vibration Isolation Mount," Journal of Acoustical Society of
America, vol. 88, No. 2, 1990, pp. 938-944.

M.W.R.M. van Overbeek, "A Method To Identify The Secondary
Path In Active Noise Control Systems," *Proc. Recent Advances in
Active Control of Sound and Vibration*, 1991.

S.M. Kuo, M. Wang, and K. Chen, "Active Noise Control System
with Parallel On-Line Error Path Modeling Algorithm," *Noise
Control Engineering Journal*, vol. 39, No. 3, 1992, pp. 119-127.

(Continued)

Primary Examiner—Vivian Chin

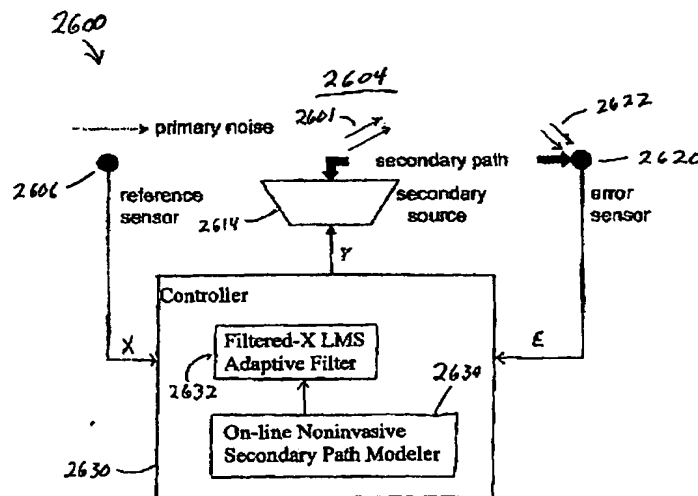
Assistant Examiner—Devona E Faulk

(74) *Attorney, Agent, or Firm*—Ohlandt, Greeley, Ruggiero
& Perle, L.L.P.

(57) **ABSTRACT**

A method for noninvasive on-line secondary path modeling
for the filtered-X LMS algorithm actively controls periodic
noise. The method, based in the frequency domain, uses the
concept of linear independence of two equations/two
unknowns to arrive at the secondary path estimate. Linear
independence of the two equations is achieved by adjusting
the control filter output via the filter coefficients prior to the
acquisition of the second set of data corresponding to the
second equation.

9 Claims, 24 Drawing Sheets



RECEIVED-USPTO
Patent Publication

APR 02 2008



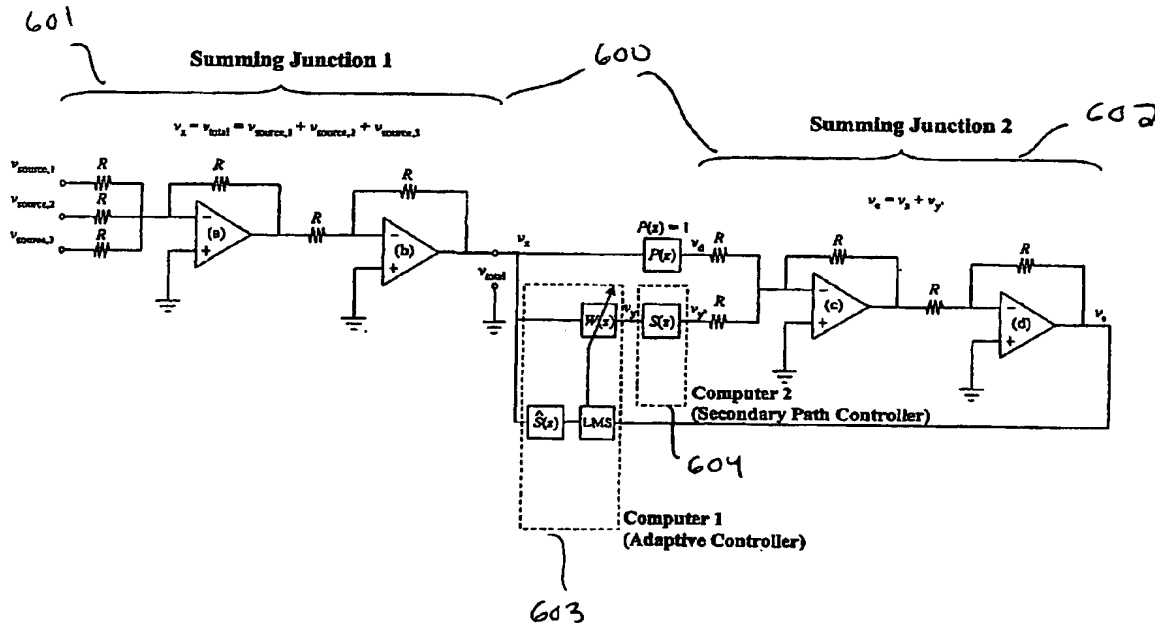
US 20040037430A1

(19) **United States**(12) **Patent Application Publication** (10) **Pub. No.: US 2004/0037430 A1****Kim**(43) **Pub. Date:****Feb. 26, 2004**(54) **LINEAR INDEPENDENCE METHOD FOR
NONINVASIVE ON-LINE SYSTEM
IDENTIFICATION/SECONDARY PATH
MODELING FOR FILTERED-X LMS-BASED
ACTIVE NOISE CONTROL SYSTEMS****Related U.S. Application Data**

(60) Provisional application No. 60/397,526, filed on Jul. 19, 2002.

Publication Classification(51) **Int. Cl.⁷** **A61F 11/06; G10K 11/16;**
H03B 29/00(52) **U.S. Cl.** **381/71.8; 381/71.11**(75) **Inventor:** **Benjamin Jung Kim, State College, PA**
(US)**Correspondence Address:****Paul D. Greeley, Esq.****Ohlandt, Greeley, Ruggiero & Perle, L.L.P.****10th Floor****One Landmark Square****Stamford, CT 06901-2682 (US)**(73) **Assignee:** **THE PENN STATE RESEARCH**
FOUNDATION(21) **Appl. No.:** **10/619,801**(22) **Filed:** **Jul. 16, 2003**(57) **ABSTRACT**

A method for noninvasive on-line secondary path modeling for the filtered-X LMS algorithm actively controls periodic noise. The method, based in the frequency domain, uses the concept of linear independence of two equations/two unknowns to arrive at the secondary path estimate. Linear independence of the two equations is achieved by adjusting the control filter output via the filter coefficients prior to the acquisition of the second set of data corresponding to the second equation.

RECEIVED-USPTO
Patent Publication

APR 02 2008



UNITED STATES PATENT AND TRADEMARK OFFICE

UNDER SECRETARY OF COMMERCE FOR INTELLECTUAL PROPERTY AND
DIRECTOR OF THE UNITED STATES PATENT AND TRADEMARK OFFICE

JANUARY 23, 2004

PTAS



102503014A

OHLANDT, GREELEY ET AL
PAUL D. GREELEY, ESQ.
ONE LANDMARK SQUARE, 10TH FLOOR
STAMFORD, CT 06901-2682

UNITED STATES PATENT AND TRADEMARK OFFICE
NOTICE OF RECORDATION OF ASSIGNMENT DOCUMENT

THE ENCLOSED DOCUMENT HAS BEEN RECORDED BY THE ASSIGNMENT DIVISION OF THE U.S. PATENT AND TRADEMARK OFFICE. A COMPLETE MICROFILM COPY IS AVAILABLE AT THE ASSIGNMENT SEARCH ROOM ON THE REEL AND FRAME NUMBER REFERENCED BELOW.

PLEASE REVIEW ALL INFORMATION CONTAINED ON THIS NOTICE. THE INFORMATION CONTAINED ON THIS RECORDATION NOTICE REFLECTS THE DATA PRESENT IN THE PATENT AND TRADEMARK ASSIGNMENT SYSTEM. IF YOU SHOULD FIND ANY ERRORS OR HAVE QUESTIONS CONCERNING THIS NOTICE, YOU MAY CONTACT THE EMPLOYEE WHOSE NAME APPEARS ON THIS NOTICE AT 703-308-9723. PLEASE SEND REQUEST FOR CORRECTION TO: U.S. PATENT AND TRADEMARK OFFICE, ASSIGNMENT DIVISION, BOX ASSIGNMENTS, CG-4, 1213 JEFFERSON DAVIS HWY, SUITE 320, WASHINGTON, D.C. 20231.

RECORDATION DATE: 07/16/2003

REEL/FRAME: 014280/0876

NUMBER OF PAGES: 4

BRIEF: ASSIGNMENT OF ASSIGNOR'S INTEREST (SEE DOCUMENT FOR DETAILS).

ASSIGNOR:

KIM, BENJAMIN JUNG

DOC DATE: 07/15/2003

ASSIGNEE:

PENN STATE RESEARCH FOUNDATION,
THE
304 OLD MAIN
UNIVERSITY PARK, PENNSYLVANIA 16802

SERIAL NUMBER: 10619801

FILING DATE: 07/16/2003

PATENT NUMBER:

ISSUE DATE:

RECEIVED-USPTO
Patent Publication

JAN 30 2004

APR 02 2008

014280/0876 PAGE 2

STEVEN POST, EXAMINER
ASSIGNMENT DIVISION
OFFICE OF PUBLIC RECORDS

RECEIVED-USPTO
Patent Publication

APR 02 2008

07-22-2003

RE



RET

102503014

15535 U.S. PTO

10/619801



TO THE HONORABLE COMMISSIONER OF PATENTS AND TRADEMARKS
Mail Stop Assignment Recordation Services, P.O. Box 1450, Alexandria, VA 22313-1450

Please record the attached original documents or copies thereof.

1. Name of conveying party(ies):

BENJAMIN JUNG KIM

7-16-03

2. Name and address of receiving party(ies):

**THE PENN STATE RESEARCH FOUNDATION
304 OLD MAIN
UNIVERSITY PARK, PENNSYLVANIA 16802**

3. Nature of conveyance:

XXXX

Assignment

_____ Merger

_____ Security Agreement

_____ Change of Name

_____ Other: _____

Execution Date: **July 15, 2003**

10619801

4. Application number(s) or application date(s):

If this document is being filed together with a new application, the execution date of the application is: **July 15, 2003**

A. Application/Patent No.

NOT YET ASSIGNED

B. Application/Issue Date

NOT YET ASSIGNED

5. Name and address of party to whom correspondence concerning this document should be mailed:

Paul D. Greeley, Esq.

Ohlandt, Greeley, Ruggiero & Perle, L.L.P.

One Landmark Square, 10th Floor

Stamford, Connecticut 06901-2682 U.S.A.

6. Total No. of applications and patents involved: 1

7. Total Fee (37 C.F.R. 3.41(h)) \$40.00/assignment.

XXXXX

Enclosed

_____ Authorized to be charged to deposit account.

The Commissioner is hereby authorized to charge any additional fees under 37 C.F.R. 3.41 that may be required with this communication or credit any overpayment, to Deposit Account No. 01-0467. A duplicate copy of this Form is enclosed.

To the best of my knowledge and belief, the foregoing information is true and correct and any attached copy is a true copy of the original document.

Paul D. Greeley

Name of Person Signing

Paul D. Greeley

Signature

07/15/03

Date

Total number of pages including cover sheet, attachments and document: 3

RECEIVED-USPTO
Patent Publication

APR 02 2008

823.0145USU

ASSIGNMENT

FOR valuable and legally sufficient considerations, receipt of which is hereby acknowledged, I, Benjamin Jung Kim, a citizen of the United States of America, and a resident of 125 W. Park Avenue, Rm 9, State College, PA 16803 have invented certain new and useful improvements in

**A LINEAR INDEPENDENCE METHOD FOR NONINVASIVE ON-LINE SYSTEM
IDENTIFICATION/SECONDARY PATH MODELING FOR FILTERED-X LMS-BASED
ACTIVE NOISE CONTROL SYSTEMS**

hereby assigns to The Penn State Research Foundation, a Not for Profit organization, having its principal office at 304 Old Main, University Park, Pennsylvania 16802 (hereinafter referred to as "Assignee"), the entire right, title and interest in and to such invention, together with the patent rights and rights of protection to the same throughout the world, including any patent rights which may result from the application for United States Letters Patent which was filed in the United States Patent and Trademark Office on _____ and assigned Application Serial No. _____, and any continuation, divisions, continuation-in-part applications, inventor's certificates and extensions thereof, preparatory to obtaining Letters Patent of the United States therefor; said invention, application and Letters Patent to be held and enjoyed by said Assignees for their own use and behoof and for the use and behoof of their successors and assigns, to the full end of the term for which said Letters Patent or other rights of protection may be granted as entirely as the same would have been held and enjoyed by me had the assignment not been made.

AND I COVENANT and AGREE and WARRANT that I have full and unencumbered title to the invention hereby assigned, and I further covenant and agree that I have the right to grant such rights to said invention and application and Letters Patent and that I will, at any time upon request without cost to us or further

RECEIVED-USPTO
Patent Publication

APR 02 2008

RECORDATION FORM COVER SHEET PATENTS ONLY

TO THE HONORABLE COMMISSIONER OF PATENTS AND TRADEMARKS
Mail Stop Assignment Recordation Services, P.O. Box 1450, Alexandria, VA 22313-1450



Please record the attached original documents or copies thereof.

1. Name of conveying party(ies):
BENJAMIN JUNG KIM
2. Name and address of receiving party(ies):
**THE PENN STATE RESEARCH FOUNDATION
304 OLD MAIN
UNIVERSITY PARK, PENNSYLVANIA 16802**
3. Nature of conveyance:

<u>XXXX</u>	Assignment	_____	Merger
_____	Security Agreement	_____	Change of Name
_____	Other: _____		

Execution Date: **July 15, 2003**
4. Application number(s) or application date(s):

If this document is being filed together with a new application, the execution date of the application is: **July 15, 2003**

A. <u>Application/Patent No.</u>	B. <u>Application/Issue Date</u>
NOT YET ASSIGNED	NOT YET ASSIGNED
5. Name and address of party to whom correspondence concerning this document should be mailed:

Paul D. Greeley, Esq.
Ohlandt, Greeley, Ruggiero & Perle, L.L.P.
One Landmark Square, 10th Floor
Stamford, Connecticut 06901-2682 U.S.A.
6. Total No. of applications and patents involved: 1
7. Total Fee (37 C.F.R. 3.41(h)) \$40.00/assignment.

<u>XXXXX</u>	Enclosed
_____	Authorized to be charged to deposit account.

The Commissioner is hereby authorized to charge any additional fees under 37 C.F.R. 3.41 that may be required with this communication or credit any overpayment, to Deposit Account No. 01-0467. A duplicate copy of this Form is enclosed.

To the best of my knowledge and belief, the foregoing information is true and correct and any attached copy is a true copy of the original document.

Paul D. Greeley
Name of Person Signing
Total number of pages including cover sheet, attachments and document: 3

Paul D. Greeley
Signature

REC-07/15/03-USPTO
Date Publication

APR 02 2008



DECLARATION AND POWER OF ATTORNEY FOR PATENT APPLICATION

Docket No. 823.0145USU

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor of the subject matter that is claimed and for which a patent is sought on the invention entitled:

A LINEAR INDEPENDENCE METHOD FOR NONINVASIVE ON-LINE SYSTEM IDENTIFICATION/SECONDARY PATH MODELING FOR FILTERED-X LMS-BASED ACTIVE NOISE CONTROL SYSTEMS

the specification of which

(check one) XXX is attached hereto.

_____ was filed on _____ as Application Serial No. _____ and was amended on _____ (if applicable).

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose to the U.S. Patent and Trademark Office all information known to me to be material to the examination of this application as defined in Title 37, Code of Federal Regulations, §1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate(s) listed below and have also identified below any foreign application(s) for patent or inventor's certificate(s) having a filing date before that of the application on which priority is claimed:

Prior Foreign Application(s)

Priority Claimed

_____ (Number)	_____ (Country)	_____ (Day/Mon/Year Filed)	Yes ___ No ___
_____ (Number)	_____ (Country)	_____ (Day/Mon/Year Filed)	Yes ___ No ___
_____ (Number)	_____ (Country)	_____ (Day/Mon/Year Filed)	Yes ___ No ___

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which

RECEIVED-USPTO
Patent Publication

APR 02 2008

occurred between the filing date of the prior application and the national or PCT International filing date of this application:

<u>60/397,523</u>	<u>July 19, 2002</u>	<u>(Status - patent, pend., abandon.)</u>
(Application Serial No.)	(Filing Date)	
<u>(Application Serial No.)</u>	<u>(Filing Date)</u>	<u>(Status - patent, pend., abandon.)</u>
(Application Serial No.)	(Filing Date)	
<u>(Application Serial No.)</u>	<u>(Filing Date)</u>	<u>(Status - patent, pend., abandon.)</u>
(Application Serial No.)	(Filing Date)	

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith.

NAMES	REGISTRATION NUMBERS
Paul D. Greeley	31,019
Charles N.J. Ruggiero	28,468

SEND CORRESPONDENCE TO:	DIRECT TELEPHONE CALLS TO:
Paul D. Greeley, Esq. Ohlandt, Greeley, Ruggiero & Perle, L.L.P. One Landmark Square, 10 th Floor Stamford, Connecticut 06901-2682	Paul D. Greeley, Esq. Telephone: (203) 327-4500 Telefax: (203) 327-6401

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

FULL NAME OF INVENTOR	LAST NAME Kim	FIRST NAME Benjamin	MIDDLE NAME Jung
RESIDENCE & CITIZENSHIP	CITY State College	STATE OR COUNTRY USA	CITIZENSHIP USA
POST OFFICE ADDRESS	P.O. ADDRESS 125 W. Park Ave., Rm 9	CITY & STATE State College, PA.	ZIP CODE 16803

Inventor's signature

Benjamin Jung Kim

Date July 15, 2003

**UNITED STATES PATENT AND TRADEMARK OFFICE
CERTIFICATE OF CORRECTION**

PATENT NO.: 7,343,016 B2

DATED: March 11, 2008

INVENTORS: Benjamin Jung KIM

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

IN THE ABSTRACT PAGE

Code (75) Please correct residence of Inventor **Benjamin Jung Kim** to read
"State College, PA (US)"

Code (73) Please correct residence of Assignee **The Penn State Research Foundation**
to read "University Park, PA (US)"

IN THE DESCRIPTION

Column 1,

Line 14, after "...periodic noise." please add the following heading and paragraph from
Line 15 and following:

--FEDERALLY SPONSORED RESEARCH AND DEVELOPMENT

This invention was made with government support under Contract No.
N00039-97-D-0042, Delivery Order No. 227, awarded by the Naval Sea Systems
Command. The Government has certain rights in the invention.--

MAILING ADDRESS OF SENDER:

Ohlandt, Greeley, Ruggiero & Perle, L.L.P.
One Landmark Square, 10th Floor
Stamford, Connecticut 06901-2682

Patent No.: 7,343,016 B2
RECEIVED USPTO
Patent Publication

APR 02 2008

**UNITED STATES PATENT AND TRADEMARK OFFICE
CERTIFICATE OF CORRECTION**

PATENT NO.: 7,343,016 B2

DATED: March 11, 2008

INVENTORS: Benjamin Jung KIM

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

IN THE ABSTRACT PAGE

Code (75) Please correct residence of Inventor **Benjamin Jung Kim** to read
"State College, PA (US)"

Code (73) Please correct residence of Assignee **The Penn State Research Foundation**
to read "University Park, PA (US)"

IN THE DESCRIPTION

Column 1,

Line 14, after "...periodic noise." please add the following heading and paragraph from
Line 15 and following:

--FEDERALLY SPONSORED RESEARCH AND DEVELOPMENT

This invention was made with government support under Contract No.
N00039-97-D-0042, Delivery Order No. 227, awarded by the Naval Sea Systems
Command. The Government has certain rights in the invention.--

MAILING ADDRESS OF SENDER:

Ohlandt, Greeley, Ruggiero & Perle, L.L.P.
One Landmark Square, 10th Floor
Stamford, Connecticut 06901-2682

Patent No.: 7,343,016 B2

RECEIVED-USPTO
Patent Publication

APR 02 2008

**UNITED STATES PATENT AND TRADEMARK OFFICE
CERTIFICATE OF CORRECTION**

PATENT NO.: 7,343,016 B2

DATED: March 11, 2008

INVENTORS: Benjamin Jung KIM

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

IN THE ABSTRACT PAGE

Code (75) Please correct residence of Inventor **Benjamin Jung Kim** to read
"State College, PA (US)"

Code (73) Please correct residence of Assignee **The Penn State Research Foundation**
to read "University Park, PA (US)"

IN THE DESCRIPTION

Column 1,

Line 14, after "...periodic noise." please add the following heading and paragraph from
Line 15 and following:

--FEDERALLY SPONSORED RESEARCH AND DEVELOPMENT

This invention was made with government support under Contract No.
N00039-97-D-0042, Delivery Order No. 227, awarded by the Naval Sea Systems
Command. The Government has certain rights in the invention.--

MAILING ADDRESS OF SENDER:

Patent No.: 7,343,016 B2
OFFICE OF THE COMPTROLLER
OF THE PATENT OFFICE

Ohlandt, Greeley, Ruggiero & Perle, L.L.P.
One Landmark Square, 10th Floor
Stamford, Connecticut 06901-2682

APR 02 2008